7-8-2019

Collaborative Research: TESPRESSO, Tectonic Encoding, Shredding, and PRopagation of Environmental Signals as Surficial Observables

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Data Management Plan

I. Data Produced

The proposed project will generate geomorphology and stratigraphic field data, numeric age control from luminescence dating, terrestrial cosmogenic nuclide (TCN) ^{10}Be erosion and paleoerosion rate data, rock-magnetic cyclostratigraphic data, and LandLab source codes and numeric landscape evolution models.

II. Data Formats

Field data will be collected in notebooks, backed up by field computers and tablets. All TCN and geochronologic data will be stored and archived in ASCII format. Graphical output will be stored in PDF format. TCN and geochronologic physical data will be in the form of sediment samples, most of which will be consumed during sample processing. Rock-mag data will be in the form of sediment housed in 2x2x2 cm plastic cubes. LandLab LEM source codes are written in Python. CPython, the reference implementation of Python is open source software.

III. Data Accessing and Sharing

In addition to publishing data in manuscripts and supplemental materials, all data will be available via:

Geomorphology: notebooks scanned, archived, and made publicly available by Lehigh Library and Technology Services. http://preserve.lehigh.edu/cas-ees-field-notebooks/

Geochronology: The USGS National Geochronological database (http://mrdata.usgs.gov/geochronology/geochron.html) and EarthScope website (http://www.earthscope.org/). OSL samples will be given USU Luminescence Lab identification numbers and all processed material and data will be stored indefinitely at the USU Luminescence Lab per NSF-supported Geochronology Lab Standards.

TCN: Physical materials (non-consumed sediment) will be preserved at the Community Cosmogenic Lab at the University of Vermont and available upon request. Samples may be transferred to the National Archival Labs, if an Archival Lab is available in the future.

Rock-Mag: data will be stored in the superconducting rock magnetometer's data acquisition computer as well as a back up hard drive. The measurement data will be stored in the binary data format used by the 2G data acquisition program (2G Enterprises, Inc.). We will measure the stratigraphic position of each sample in the field and store these data on a computer in the paleomagnetism laboratory. The data will be made publicly available in the MagIC paleomagnetic and rock magnetic databases (http://earthref.org/MAGIC/) of the Magnetics Information Consortium.

Modeling: The source codes of the numerical models and Landlab components developed, updated, and used in this project, model and component documentation, and tutorials will all be archived on the Landlab GitHub pages (https://github.com/landlab). The source codes of the analytical and the numerical models, the model user's guides, the model documentation, and the description of the procedures used to prepare the field data for the numerical runs will be organized following the standards required from the model and data repositories of the NSF supported Community Surface Dynamics Modeling Systems (CSDMS) (http://csdms.colorado.edu/wiki/Contribute_model, http://csdms.colorado.edu/wiki/Data_contribute). All code that is not a model will be added to the main Landlab repository (https://github.com/landlab/landlab). We will strive to make these additions available as soon as they are tested, but no later than when manuscripts are submitted.

IV. Policies for re-use and re-distribution

All published data will be available for re-use and re-distribution provided that references to appropriate publications are made following completion of the project unless stated otherwise.

Geomorphology: All field data published or otherwise, can be re-used for derivative products from http://preserve.lehigh.edu/cas-ees-field-notebooks/ following conclusion of the project.

Geochronology: Published data will be available from the USGS National Geochronological database and EarthScope website. Quartz and feldspar separates from each sample will be stored indefinitely at the USU Luminescence Lab and subsets of this material will be made available upon request.

TCN: Sample materials and the metadata needed to make use of them in future (field and laboratory notebooks, maps, etc.) will be freely available to interested parties. The preparation of TCN samples is destructive and therefore much of the original material will not be available. If there is any leftover material, it will be archived by PRIME Lab and UVT (see below) for further analysis by project personnel or other researchers, if requested.

Rock-mag: The sediment-filled plastic cubes analyzed for rock-mag are stored in the paleomag lab at Lehigh University and will be available upon request for re-use. Some of the rock-mag measurements made on those samples are destructive so re-uses are limited.

Modeling: Components will be added to the main Landlab repository (https://github.com /landlab/landlab), and these additions will be made as soon as components are tested.

V. Data storage and backup

Geomorphology: notebooks scanned, archived, and made publicly available by Lehigh Library and Technology Services. http://preserve.lehigh.edu/cas-ees-field-notebooks/

Geochronology: All data will be stored at the USU Luminescence Lab in addition to long-term archiving on databases listed above. Long-term storage at each lab will include duplicate back-up on local servers and external hard-drives. OSL samples and data will be given Lab identification numbers and all processed material and data will be stored indefinitely at the USU Luminescence Lab.

TCN: All TCN data that we collect will be archived in NSF-funded databases (EarthChem), and each characterized samples will be given an IGSN (International Geo Sample Number), and using the System for Earth Science Sample Registration (SESAR): http://www.geosamples.org/. In addition, the Purdue Rare Isotope Measurement Laboratory (PRIME Lab), where all samples will be prepared and measured for ^{10}Be, also maintains a data archive. During data archiving, standards for data and metadata preservation that will be followed include those outlined in Frankel et al. (2010). *Frankel, K., Finkel, R., Owen, L.A., 2010. Terrestrial cosmogenic nuclide geochronology data reporting standards needed. Eos Trans. AGU 91, 26.*

Rock-Mag: The data will be made publicly available and archived in the MagIC paleomagnetic and rock magnetic databases (http://earthref.org/MAGIC/) of the Magnetics Information Consortium, therefore we will follow the metadata conventions of that database which has been designed to archive paleomagnetic and rock magnetic data.

Modeling: Model driver codes that are specific to this project or to specific manuscripts will reside in new repositories on the main Landlab page (for example, see https://github.com/landlab/pub_tucker_etal_gmd), posted when manuscripts are submitted. These repositories will include model python code files (remember that every Landlab model is a unique python file that calls code in the existing Landlab library) and also information on the unique version of Landlab on which the model(s) were run. These repositories would also include any initial condition and input files required to run the model. Any tutorials developed for general Landlab educational purposes (generally for individual users to learn to use Landlab on their own) will be stored in the tutorial repository (https://github.com/landlab/tutorials). Tutorials developed specifically for classroom educational purposes (generally for use in learning about concepts –not how to use specific parts of Landlab – in undergraduate or graduate courses) will be stored in the teaching tools repository (https://github.com/landlab/landlab_teaching_tools). Changes, updates, and additions that are made to the main code base through this project will be fully documented on the main Landlab documentation page (https://github.com/landlab/landlab/wiki/User-Guide). All code developed for this project will be fully in-line tested, and standard Landlab practices of code review before resubmitting to the main repository will be followed.